LINUX KERNEL COMPILATION

INSTALLATION OF KERNEL 4.10.3

3/16/2017

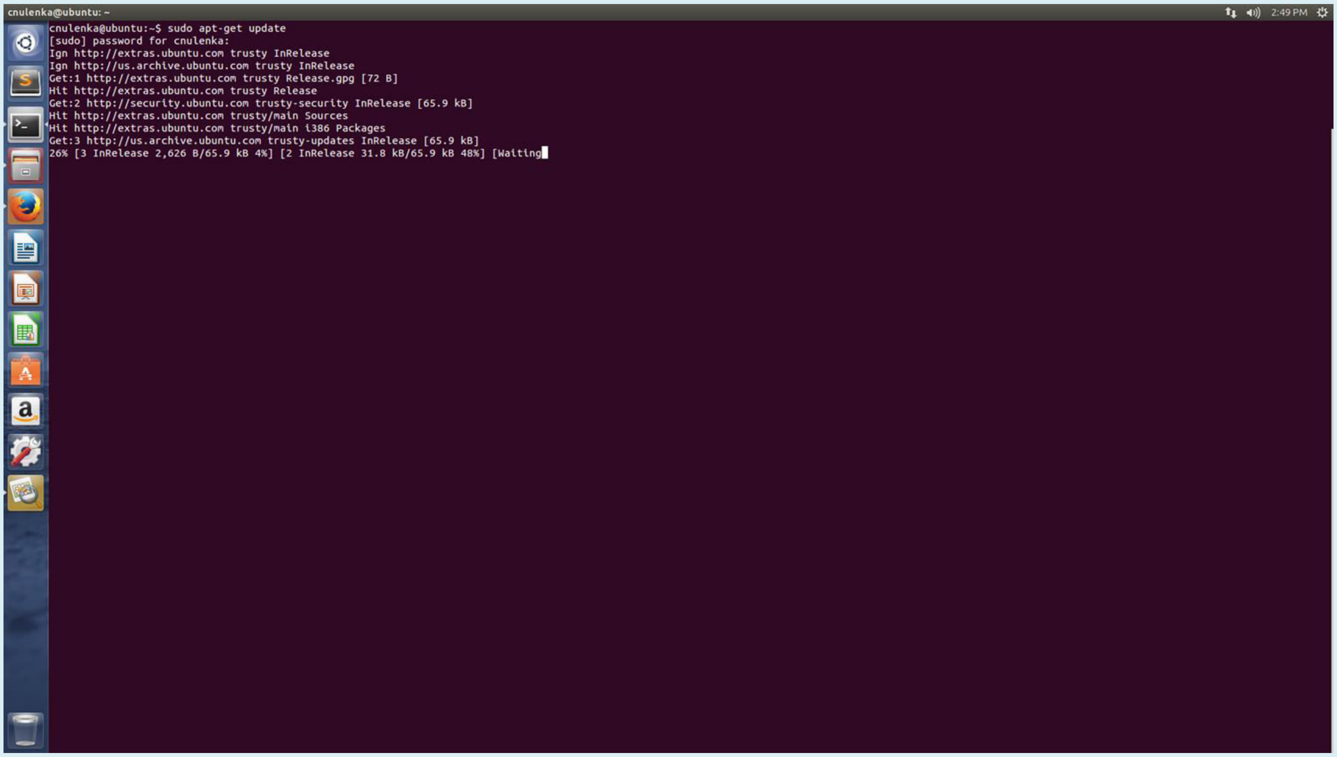
INTERNATIONAL INSTITUTE OF INFORMATION TECHNOLOGY, BHUBANESWAR

GROUP MEMBERS:

- REEVA MISHRA(B114028)
- SASMIT DAS(B114036)
- SHAKTI PRASAD LENKA(B114038)
- SWOSTI PRIYADARSHINI(B114052)

Step 1:

Run *sudo apt-get update* .

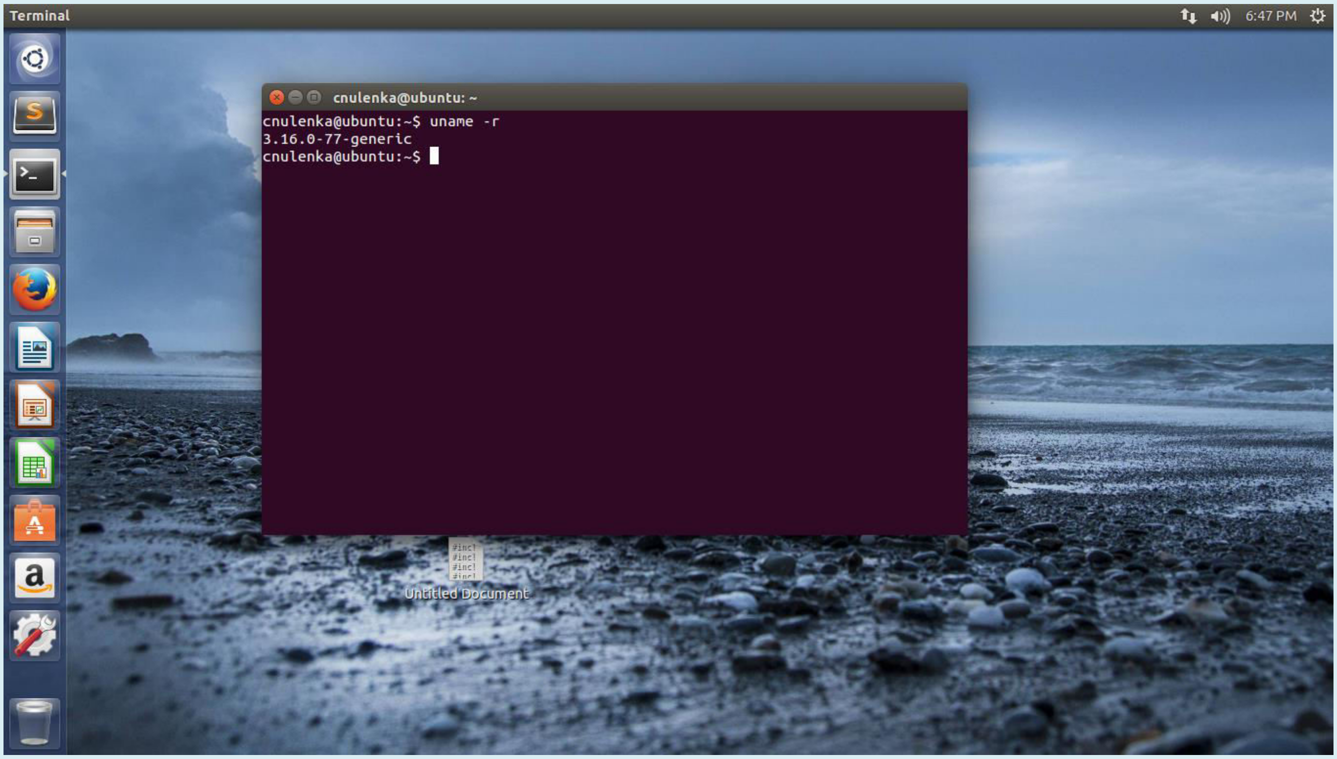


```
cnulenka@ubuntu:~$ sudo apt-get update
[sudo] password for cnulenka:
Ign http://extras.ubuntu.com trusty InRelease
Ign http://us.archive.ubuntu.com trusty InRelease
Get:1 http://extras.ubuntu.com trusty Release.gpg [72 B]
Hit http://extras.ubuntu.com trusty Release
Get:2 http://security.ubuntu.com trusty-security InRelease [65.9 kB]
Hit http://extras.ubuntu.com trusty/main Sources
Hit http://extras.ubuntu.com trusty/main i386 Packages
Get:3 http://us.archive.ubuntu.com trusty-updates InRelease [65.9 kB]
26% [3 InRelease 2,626 B/65.9 kB 4%] [2 InRelease 31.8 kB/65.9 kB 48%] [Waiting
```

1. Running this simply makes sure the list of packages from all repositories
2. PPA's is up to date.
3. It is also recommended to run a software update using Ubuntu Software Updater.

Step 2:

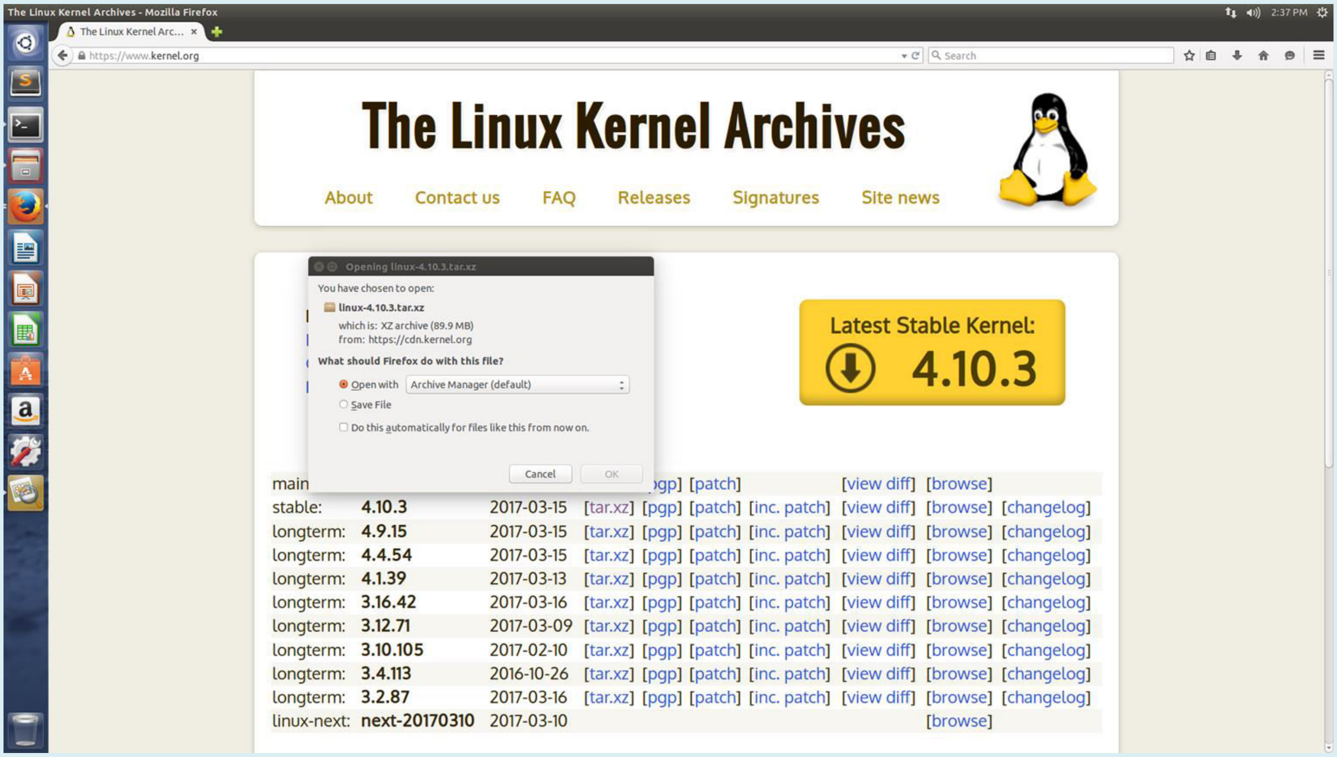
Check the current version of the Linux Kernel using *uname -r* .



```
cnulenka@ubuntu:~$ uname -r
3.16.0-77-generic
cnulenka@ubuntu:~$
```

Step 3:

Download the latest stable release of the Linux Kernel. We used kernel 4.10.3.



Opening linux-4.10.3.tar.xz

You have chosen to open:

linux-4.10.3.tar.xz

which is: XZ archive (89.9 MB)
from: https://cdn.kernel.org

What should Firefox do with this file?

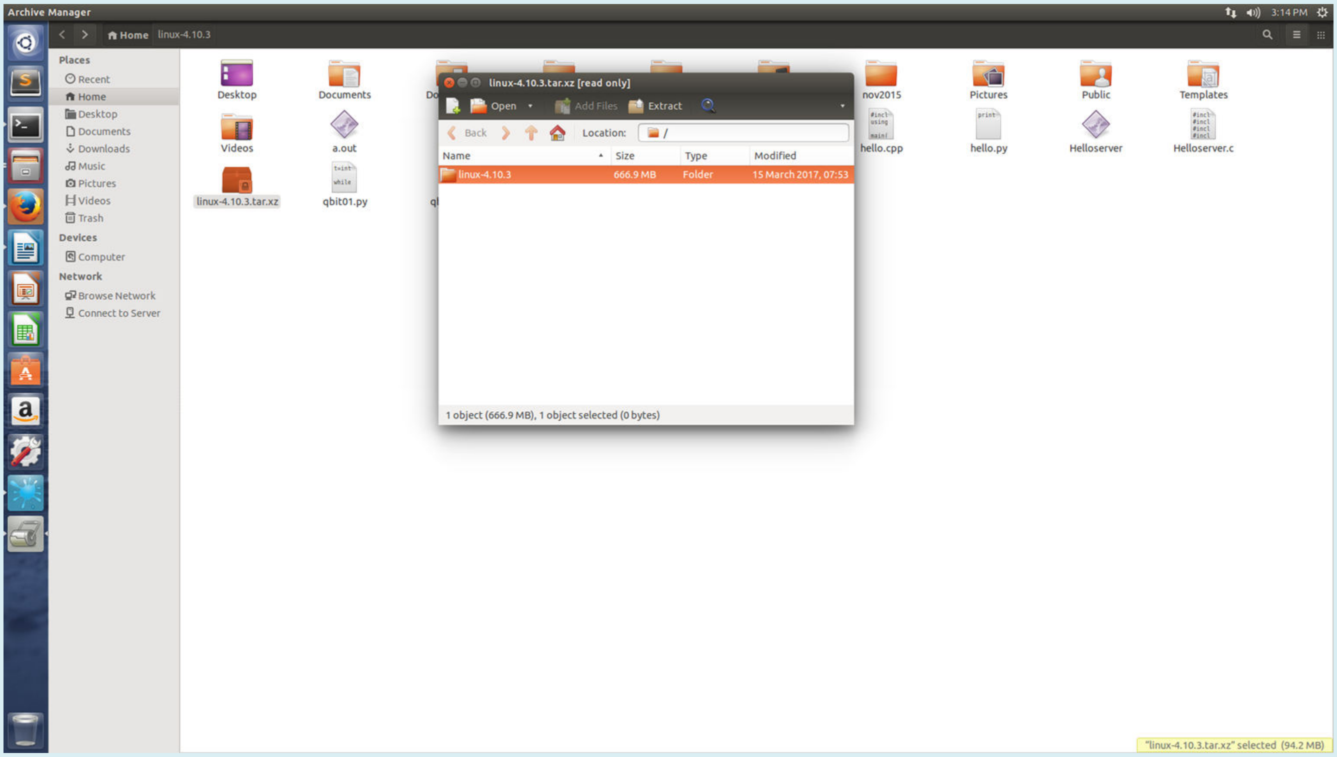
● Open with Archive Manager (default)
○ Save File
□ Do this automatically for files like this from now on.

Cancel OK

main				pgp]	[patch]		[view diff]	[browse]	
stable:	4.10.3	2017-03-15	[tar.xz]	[pgp]	[patch]	[inc. patch]	[view diff]	[browse]	[changelog]
longterm:	4.9.15	2017-03-15	[tar.xz]	[pgp]	[patch]	[inc. patch]	[view diff]	[browse]	[changelog]
longterm:	4.4.54	2017-03-15	[tar.xz]	[pgp]	[patch]	[inc. patch]	[view diff]	[browse]	[changelog]
longterm:	4.1.39	2017-03-13	[tar.xz]	[pgp]	[patch]	[inc. patch]	[view diff]	[browse]	[changelog]
longterm:	3.16.42	2017-03-16	[tar.xz]	[pgp]	[patch]	[inc. patch]	[view diff]	[browse]	[changelog]
longterm:	3.12.71	2017-03-09	[tar.xz]	[pgp]	[patch]	[inc. patch]	[view diff]	[browse]	[changelog]
longterm:	3.10.105	2017-02-10	[tar.xz]	[pgp]	[patch]	[inc. patch]	[view diff]	[browse]	[changelog]
longterm:	3.4.113	2016-10-26	[tar.xz]	[pgp]	[patch]	[inc. patch]	[view diff]	[browse]	[changelog]
longterm:	3.2.87	2017-03-16	[tar.xz]	[pgp]	[patch]	[inc. patch]	[view diff]	[browse]	[changelog]
linux-next:	next-20170310	2017-03-10						[browse]	

Step 4:

Extract the contents of the downloaded kernel from tar.gz format into the folder linux-4.10.3.



linux-4.10.3.tar.xz [read only]

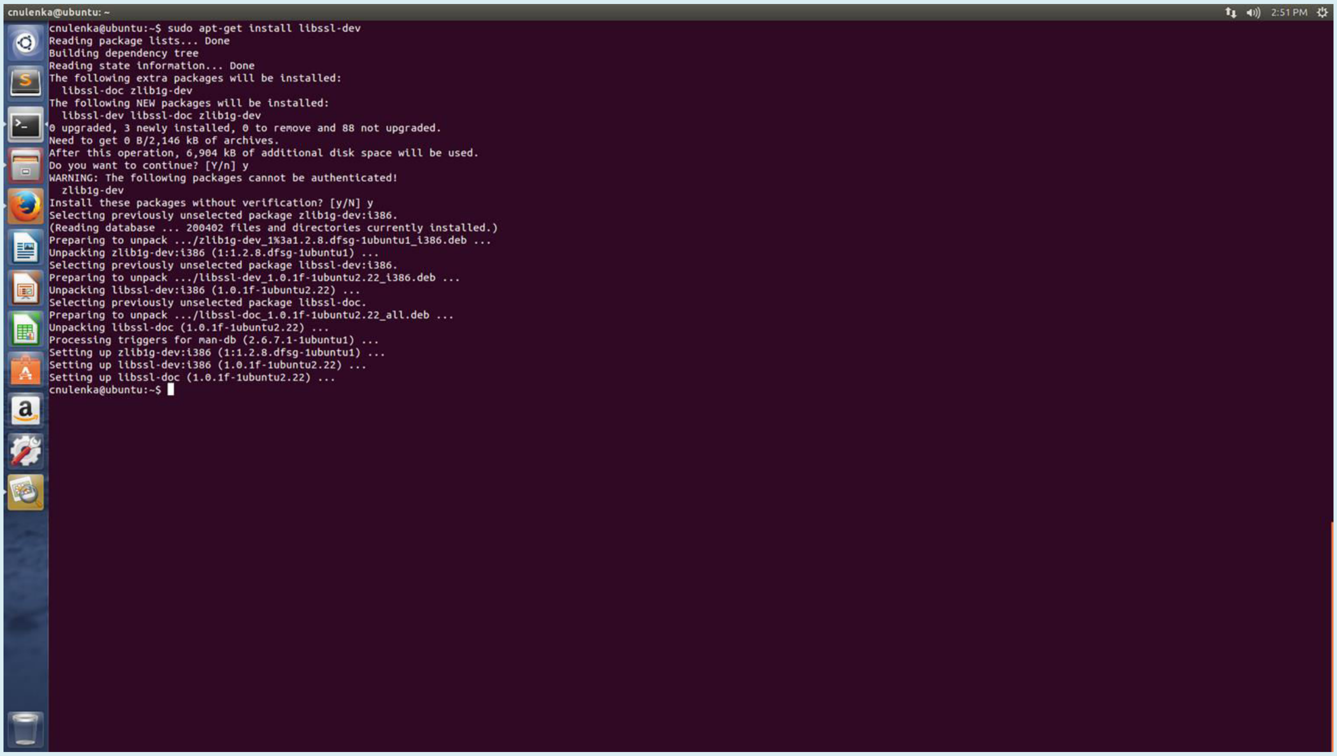
Name	Size	Type	Modified
linux-4.10.3	666.9 MB	Folder	15 March 2017, 07:53

1 object (666.9 MB), 1 object selected (0 bytes)

"linux-4.10.3.tar.xz" selected (94.2 MB)

Step 5:

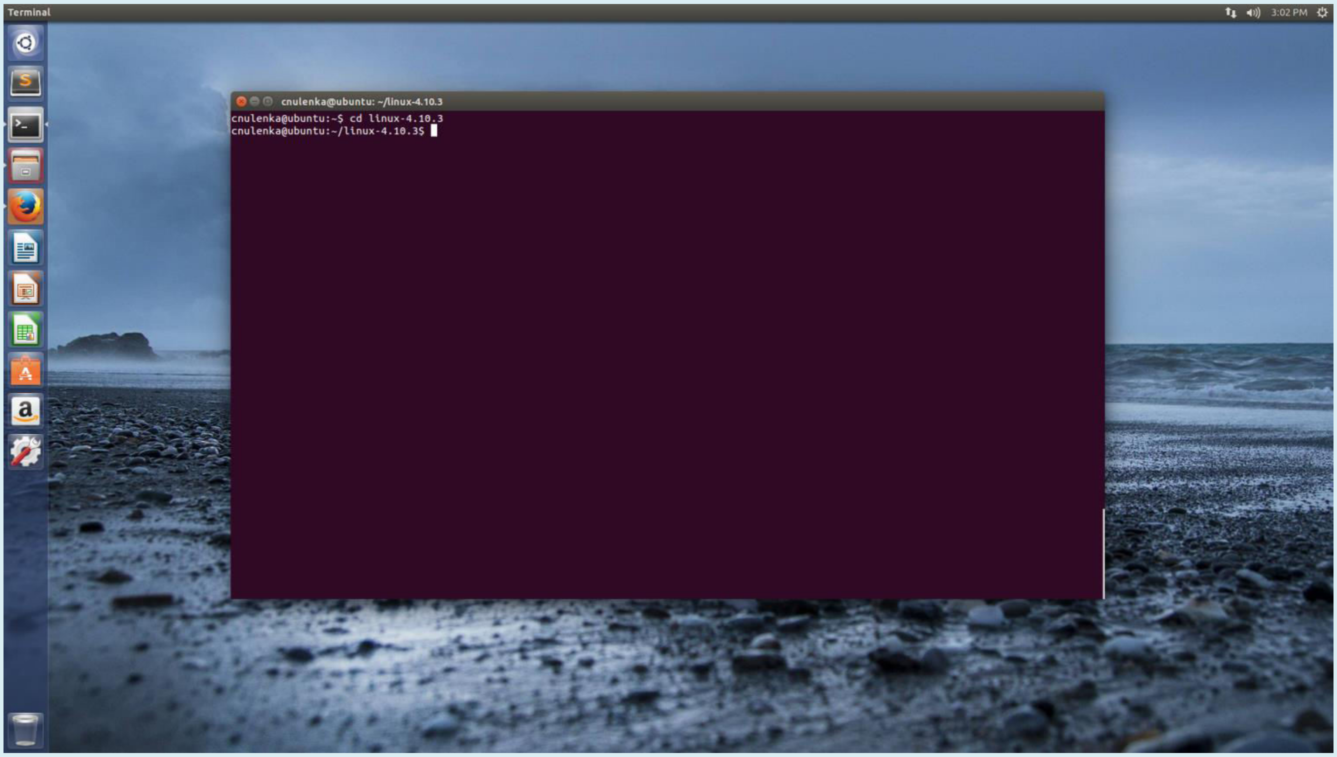
1. From the terminal, run the following commands to install libncurses5.dev
2. and libssl utilities which will be needed as dependencies
3. while building the linux kernel- *sudo apt-get install libssl libncurses5.dev*.



```
cnulenka@ubuntu:~$ sudo apt-get install libssl-dev
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following extra packages will be installed:
  libssl-doc zlib1g-dev
The following NEW packages will be installed:
  libssl-dev libssl-doc zlib1g-dev
0 upgraded, 3 newly installed, 0 to remove and 88 not upgraded.
Need to get 0 B/2,146 kB of archives.
After this operation, 6,904 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
WARNING: The following packages cannot be authenticated!
  zlib1g-dev
Install these packages without verification? [y/N] y
Selecting previously unselected package zlib1g-dev:i386.
(Reading database ... 200402 files and directories currently installed.)
Preparing to unpack .../zlib1g-dev_1%3a1.2.8.dfsg-1ubuntu1_i386.deb ...
Unpacking zlib1g-dev:i386 (1:1.2.8.dfsg-1ubuntu1) ...
Selecting previously unselected package libssl-dev:i386.
Preparing to unpack .../libssl-dev_1.0.1f-1ubuntu2.22_i386.deb ...
Unpacking libssl-dev:i386 (1.0.1f-1ubuntu2.22) ...
Selecting previously unselected package libssl-doc.
Preparing to unpack .../libssl-doc_1.0.1f-1ubuntu2.22_all.deb ...
Unpacking libssl-doc (1.0.1f-1ubuntu2.22) ...
Processing triggers for man-db (2.6.7.1-1ubuntu1) ...
Setting up zlib1g-dev:i386 (1:1.2.8.dfsg-1ubuntu1) ...
Setting up libssl-dev:i386 (1.0.1f-1ubuntu2.22) ...
Setting up libssl-doc (1.0.1f-1ubuntu2.22) ...
cnulenka@ubuntu:~$ 
```

Step 6:

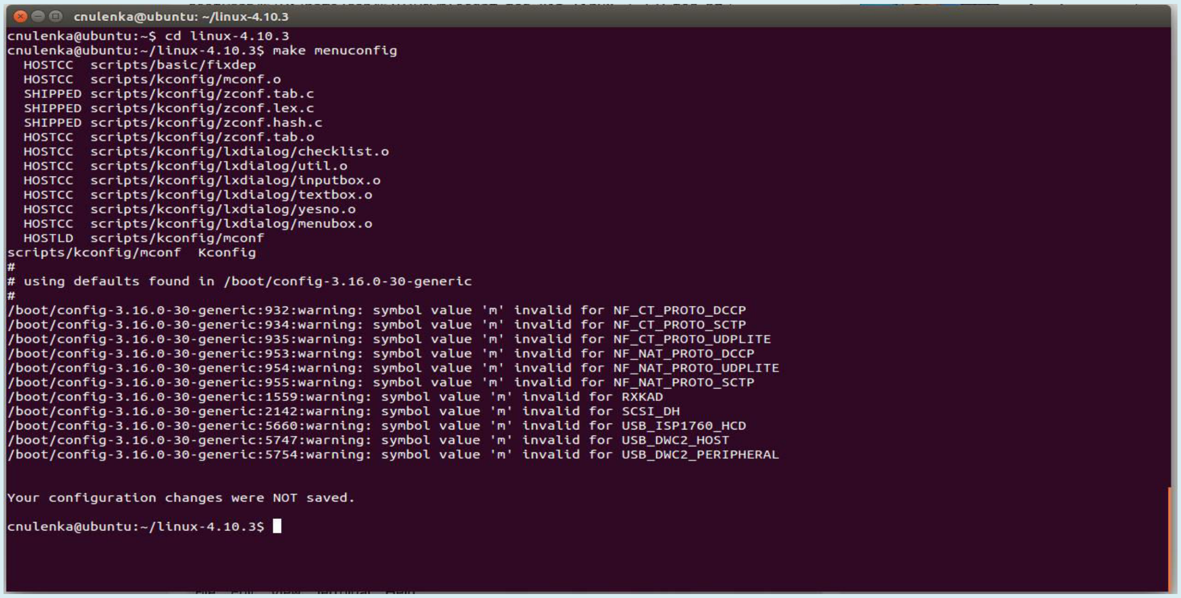
Change directory and go into the extracted folder generated in Step 4.
cd linux-4.10.3 .



```
cnulenka@ubuntu:~$ cd linux-4.10.3
cnulenka@ubuntu:~/linux-4.10.3$ 
```

Step 7:

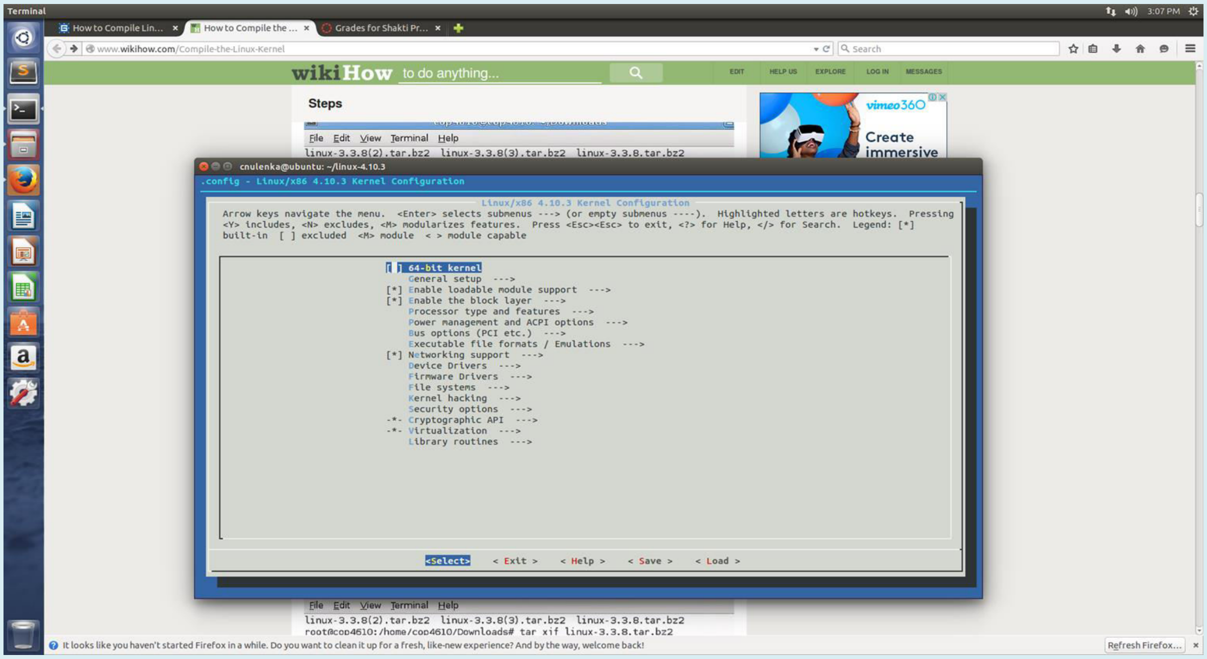
In this step, we need to generate the .config file for the kernel. This can be done by *make menuconfig*



cnulenka@ubuntu: ~/linux-4.10.3

```
cnulenka@ubuntu:~$ cd linux-4.10.3
cnulenka@ubuntu:~/linux-4.10.3$ make menuconfig
  HOSTCC  scripts/basic/fixdep
  HOSTCC  scripts/kconfig/mconf.o
  SHIPPED scripts/kconfig/zconf.tab.c
  SHIPPED scripts/kconfig/zconf.lex.c
  SHIPPED scripts/kconfig/zconf.hash.c
  HOSTCC  scripts/kconfig/zconf.tab.o
  HOSTCC  scripts/kconfig/lxdialog/checklist.o
  HOSTCC  scripts/kconfig/lxdialog/util.o
  HOSTCC  scripts/kconfig/lxdialog/inputbox.o
  HOSTCC  scripts/kconfig/lxdialog/textbox.o
  HOSTCC  scripts/kconfig/lxdialog/yesno.o
  HOSTCC  scripts/kconfig/lxdialog/menubox.o
  HOSTLD  scripts/kconfig/mconf
scripts/kconfig/mconf  Kconfig
#
# using defaults found in /boot/config-3.16.0-30-generic
#
/boot/config-3.16.0-30-generic:932:warning: symbol value 'm' invalid for NF_CT_PROTO_DCCP
/boot/config-3.16.0-30-generic:934:warning: symbol value 'm' invalid for NF_CT_PROTO_SCTP
/boot/config-3.16.0-30-generic:935:warning: symbol value 'm' invalid for NF_CT_PROTO_UDPLITE
/boot/config-3.16.0-30-generic:953:warning: symbol value 'm' invalid for NF_NAT_PROTO_DCCP
/boot/config-3.16.0-30-generic:954:warning: symbol value 'm' invalid for NF_NAT_PROTO_UDPLITE
/boot/config-3.16.0-30-generic:955:warning: symbol value 'm' invalid for NF_NAT_PROTO_SCTP
/boot/config-3.16.0-30-generic:1559:warning: symbol value 'm' invalid for RXKAD
/boot/config-3.16.0-30-generic:2142:warning: symbol value 'm' invalid for SCSI_DH
/boot/config-3.16.0-30-generic:5660:warning: symbol value 'm' invalid for USB_ISP1760_HCD
/boot/config-3.16.0-30-generic:5747:warning: symbol value 'm' invalid for USB_DWC2_HOST
/boot/config-3.16.0-30-generic:5754:warning: symbol value 'm' invalid for USB_DWC2_PERIPHERAL


Your configuration changes were NOT saved.

cnulenka@ubuntu:~/linux-4.10.3$ 
```

After that, configure the settings for the .config file and save the changes made to generate the .config



cnulenka@ubuntu: ~/linux-4.10.3

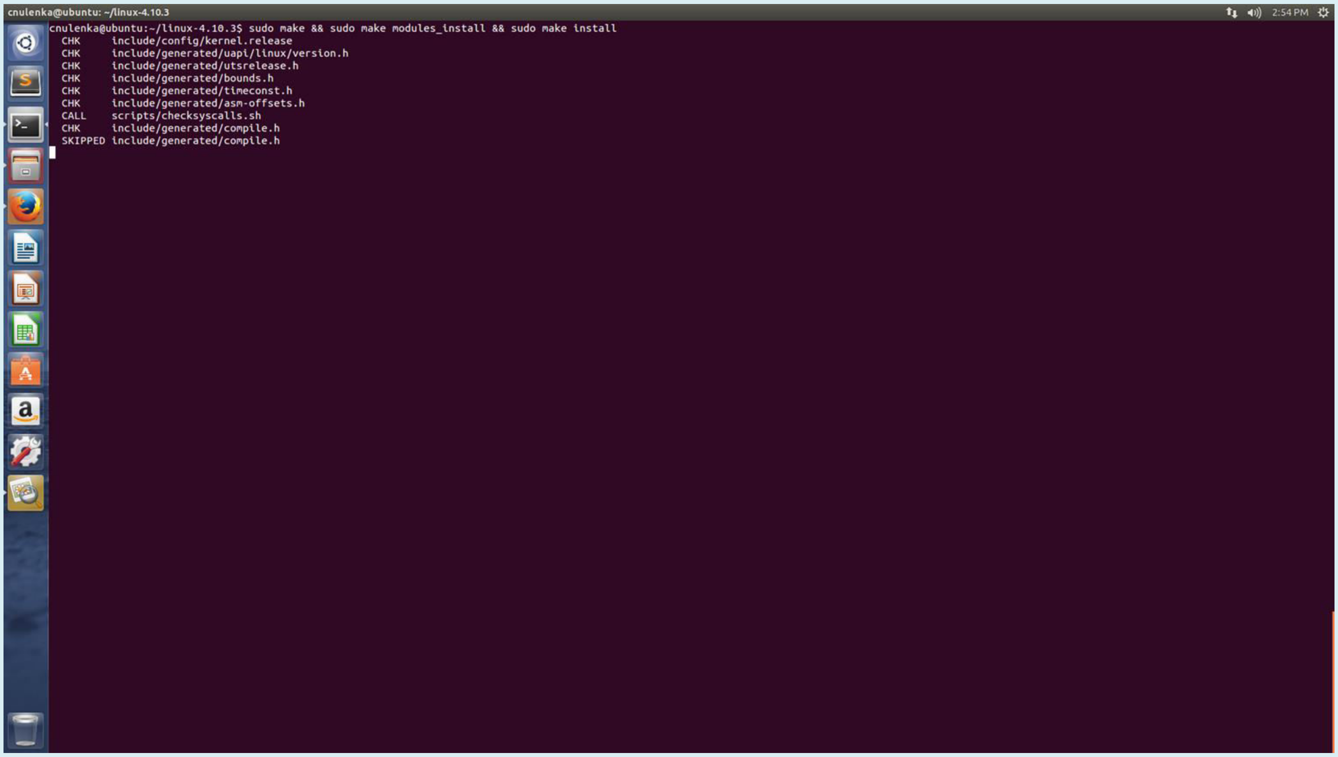
```
.config - Linux/x86 4.10.3 Kernel Configuration
                        Linux/x86 4.10.3 Kernel Configuration
  Arrow keys navigate the menu.  <Enter> selects submenus ---> (or empty submenus ----).  Highlighted letters are hotkeys.  Pressing
  <Y> includes, <N> excludes, <M> modularizes features.  Press <Esc><Esc> to exit, <?> for Help, </> for Search.  Legend: [*]
  built-in  [ ] excluded  <M> module  < > module capable

                              [ ] 64-bit kernel
                                  General setup  --->
                              [*] Enable loadable module support  --->
                              [*] Enable the block layer  --->
                                  Processor type and features  --->
                                  Power management and ACPI options  --->
                                  Bus options (PCI etc.)  --->
                                  Executable file formats / Emulations  --->
                              [*] Networking support  --->
                                  Device Drivers  --->
                                  Firmware Drivers  --->
                                  File systems  --->
                                  Kernel hacking  --->
                                  Security options  --->
                              -*- Cryptographic API  --->
                              -*- Virtualization  --->
                                  Library routines  --->

                  <Select>    < Exit >    < Help >    < Save >    < Load >
```

```
linux-3.3.8(2).tar.bz2  linux-3.3.8(3).tar.bz2  linux-3.3.8.tar.bz2
root@cop4610:/home/cop4610/Downloads# tar xif linux-3.3.8.tar.bz2
```

It looks like you haven't started Firefox in a while. Do you want to clean it up for a fresh, like-new experience? And by the way, welcome back!

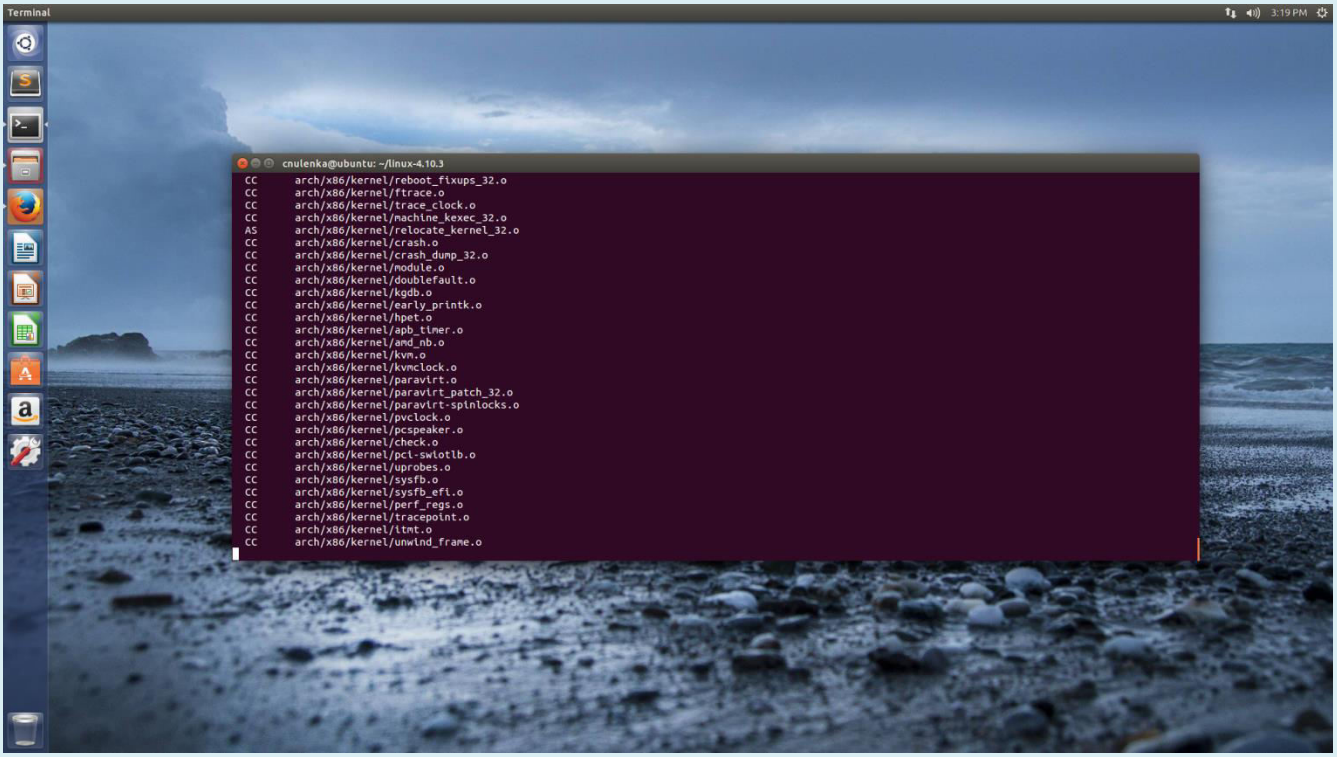
Step 8:

Now we are all set to start building and installing the kernel. Go for the following command to start building the Linux Kernel
sudo make && sudo make modules_install && sudo make install

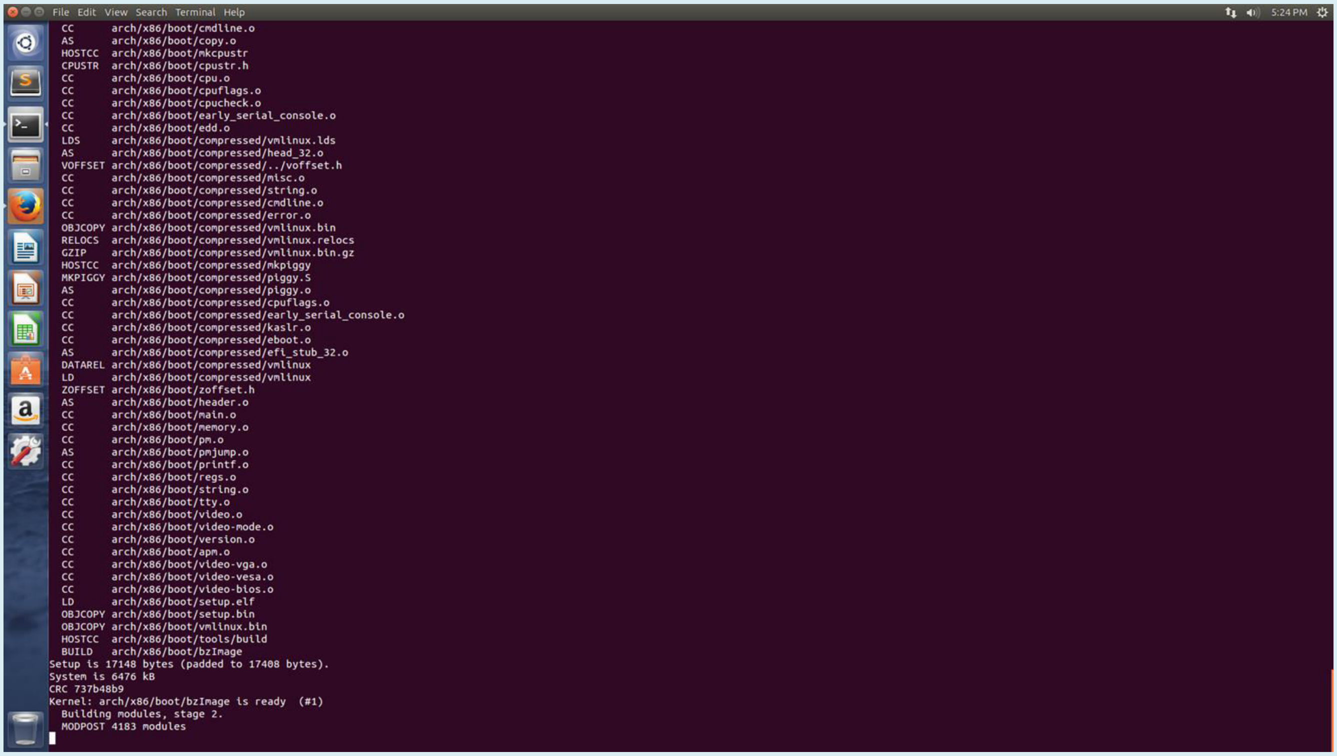


```
cnulenka@ubuntu:~/linux-4.10.3$ sudo make && sudo make modules_install && sudo make install
  CHK     include/config/kernel.release
  CHK     include/generated/uapi/linux/version.h
  CHK     include/generated/utsrelease.h
  CHK     include/generated/bounds.h
  CHK     include/generated/timeconst.h
  CHK     include/generated/asm-offsets.h
  CALL    scripts/checksyscalls.sh
  CHK     include/generated/compile.h
  SKIPPED include/generated/compile.h
```

This will start building the kernel packages and modules for the new customized kernel.

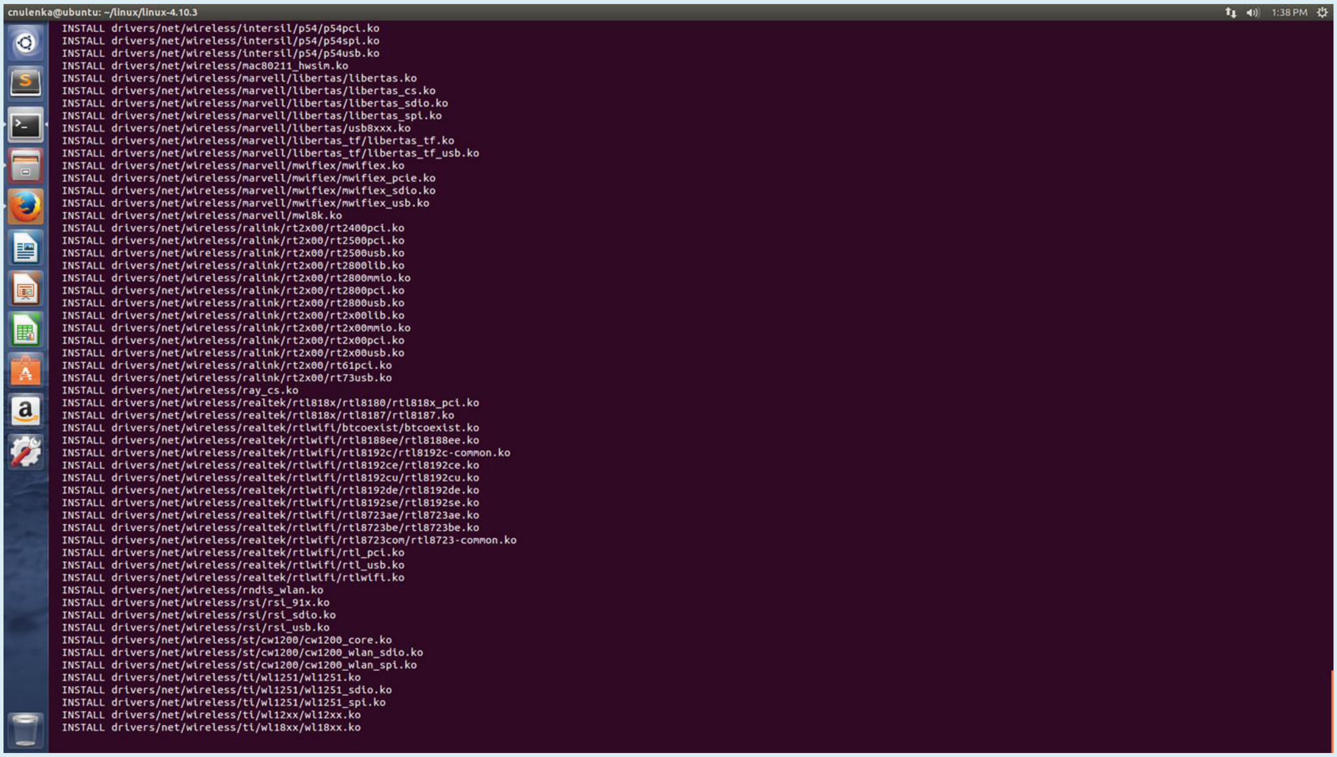


```
  CC      arch/x86/kernel/reboot_fixups_32.o
  CC      arch/x86/kernel/ftrace.o
  CC      arch/x86/kernel/trace_clock.o
  CC      arch/x86/kernel/machine_kexec_32.o
  AS      arch/x86/kernel/relocate_kernel_32.o
  CC      arch/x86/kernel/crash.o
  CC      arch/x86/kernel/crash_dump_32.o
  CC      arch/x86/kernel/module.o
  CC      arch/x86/kernel/doublefault.o
  CC      arch/x86/kernel/kgdb.o
  CC      arch/x86/kernel/early_printk.o
  CC      arch/x86/kernel/hpet.o
  CC      arch/x86/kernel/apb_timer.o
  CC      arch/x86/kernel/amd_nb.o
  CC      arch/x86/kernel/kvm.o
  CC      arch/x86/kernel/kvmclock.o
  CC      arch/x86/kernel/paravirt.o
  CC      arch/x86/kernel/paravirt_patch_32.o
  CC      arch/x86/kernel/paravirt-spinlocks.o
  CC      arch/x86/kernel/pvclock.o
  CC      arch/x86/kernel/pcspeaker.o
  CC      arch/x86/kernel/check.o
  CC      arch/x86/kernel/pci-swiotlb.o
  CC      arch/x86/kernel/uprobes.o
  CC      arch/x86/kernel/sysfb.o
  CC      arch/x86/kernel/sysfb_efi.o
  CC      arch/x86/kernel/perf_regs.o
  CC      arch/x86/kernel/tracepoint.o
  CC      arch/x86/kernel/itmt.o
  CC      arch/x86/kernel/unwind_frame.o
```



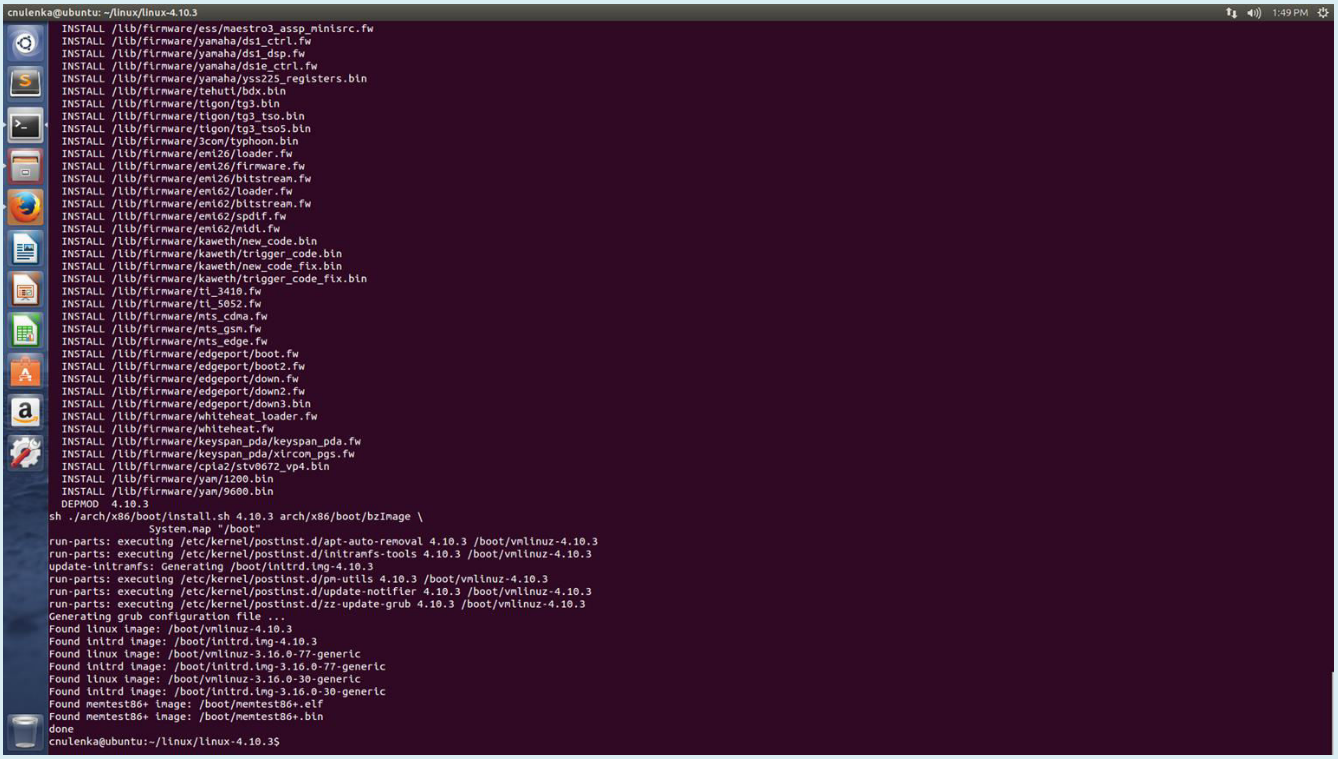
```
  CC      arch/x86/boot/cmdline.o
  AS      arch/x86/boot/copy.o
  HOSTCC  arch/x86/boot/mkcpustr
  CPUSTR  arch/x86/boot/cpustr.h
  CC      arch/x86/boot/cpu.o
  CC      arch/x86/boot/cpuflags.o
  CC      arch/x86/boot/cpucheck.o
  CC      arch/x86/boot/early_serial_console.o
  CC      arch/x86/boot/edd.o
  LDS     arch/x86/boot/compressed/vmlinux.lds
  AS      arch/x86/boot/compressed/head_32.o
  VOFFSET arch/x86/boot/compressed/../voffset.h
  CC      arch/x86/boot/compressed/misc.o
  CC      arch/x86/boot/compressed/string.o
  CC      arch/x86/boot/compressed/cmdline.o
  CC      arch/x86/boot/compressed/error.o
  OBJCOPY arch/x86/boot/compressed/vmlinux.bin
  RELOCS  arch/x86/boot/compressed/vmlinux.relocs
  GZIP    arch/x86/boot/compressed/vmlinux.bin.gz
  HOSTCC  arch/x86/boot/compressed/mkpiggy
  MKPIGGY arch/x86/boot/compressed/piggy.S
  AS      arch/x86/boot/compressed/piggy.o
  CC      arch/x86/boot/compressed/cpuflags.o
  CC      arch/x86/boot/compressed/early_serial_console.o
  CC      arch/x86/boot/compressed/kaslr.o
  CC      arch/x86/boot/compressed/eboot.o
  AS      arch/x86/boot/compressed/efi_stub_32.o
  DATAREL arch/x86/boot/compressed/vmlinux
  LD      arch/x86/boot/compressed/vmlinux
  ZOFFSET arch/x86/boot/zoffset.h
  AS      arch/x86/boot/header.o
  CC      arch/x86/boot/main.o
  CC      arch/x86/boot/memory.o
  CC      arch/x86/boot/pm.o
  AS      arch/x86/boot/pmjump.o
  CC      arch/x86/boot/printf.o
  CC      arch/x86/boot/regs.o
  CC      arch/x86/boot/string.o
  CC      arch/x86/boot/tty.o
  CC      arch/x86/boot/video.o
  CC      arch/x86/boot/video-mode.o
  CC      arch/x86/boot/version.o
  CC      arch/x86/boot/apm.o
  CC      arch/x86/boot/video-vga.o
  CC      arch/x86/boot/video-vesa.o
  CC      arch/x86/boot/video-bios.o
  LD      arch/x86/boot/setup.elf
  OBJCOPY arch/x86/boot/setup.bin
  OBJCOPY arch/x86/boot/vmlinux.bin
  HOSTCC  arch/x86/boot/tools/build
  BUILD   arch/x86/boot/bzImage
Setup is 17148 bytes (padded to 17408 bytes).
System is 6476 kB
CRC 737b48b9
Kernel: arch/x86/boot/bzImage is ready  (#1)
  Building modules, stage 2.
  MODPOST 4183 modules
```

This process takes a lot of time. Many modules are then installed.



```
  INSTALL drivers/net/wireless/intersil/p54/p54pci.ko
  INSTALL drivers/net/wireless/intersil/p54/p54spi.ko
  INSTALL drivers/net/wireless/intersil/p54/p54usb.ko
  INSTALL drivers/net/wireless/mac80211_hwsim.ko
  INSTALL drivers/net/wireless/marvell/libertas/libertas.ko
  INSTALL drivers/net/wireless/marvell/libertas/libertas_cs.ko
  INSTALL drivers/net/wireless/marvell/libertas/libertas_sdio.ko
  INSTALL drivers/net/wireless/marvell/libertas/libertas_spi.ko
  INSTALL drivers/net/wireless/marvell/libertas/usb8xxx.ko
  INSTALL drivers/net/wireless/marvell/libertas_tf/libertas_tf.ko
  INSTALL drivers/net/wireless/marvell/libertas_tf/libertas_tf_usb.ko
  INSTALL drivers/net/wireless/marvell/mwifiex/mwifiex.ko
  INSTALL drivers/net/wireless/marvell/mwifiex/mwifiex_pcie.ko
  INSTALL drivers/net/wireless/marvell/mwifiex/mwifiex_sdio.ko
  INSTALL drivers/net/wireless/marvell/mwifiex/mwifiex_usb.ko
  INSTALL drivers/net/wireless/marvell/mwl8k.ko
  INSTALL drivers/net/wireless/ralink/rt2x00/rt2400pci.ko
  INSTALL drivers/net/wireless/ralink/rt2x00/rt2500pci.ko
  INSTALL drivers/net/wireless/ralink/rt2x00/rt2500usb.ko
  INSTALL drivers/net/wireless/ralink/rt2x00/rt2800lib.ko
  INSTALL drivers/net/wireless/ralink/rt2x00/rt2800mmio.ko
  INSTALL drivers/net/wireless/ralink/rt2x00/rt2800pci.ko
  INSTALL drivers/net/wireless/ralink/rt2x00/rt2800usb.ko
  INSTALL drivers/net/wireless/ralink/rt2x00/rt2x00lib.ko
  INSTALL drivers/net/wireless/ralink/rt2x00/rt2x00mmio.ko
  INSTALL drivers/net/wireless/ralink/rt2x00/rt2x00pci.ko
  INSTALL drivers/net/wireless/ralink/rt2x00/rt2x00usb.ko
  INSTALL drivers/net/wireless/ralink/rt2x00/rt61pci.ko
  INSTALL drivers/net/wireless/ralink/rt2x00/rt73usb.ko
  INSTALL drivers/net/wireless/ray_cs.ko
  INSTALL drivers/net/wireless/realtek/rtl818x/rtl8180/rtl818x_pci.ko
  INSTALL drivers/net/wireless/realtek/rtl818x/rtl8187/rtl8187.ko
  INSTALL drivers/net/wireless/realtek/rtlwifi/btcoexist/btcoexist.ko
  INSTALL drivers/net/wireless/realtek/rtlwifi/rtl8188ee/rtl8188ee.ko
  INSTALL drivers/net/wireless/realtek/rtlwifi/rtl8192c/rtl8192c-common.ko
  INSTALL drivers/net/wireless/realtek/rtlwifi/rtl8192ce/rtl8192ce.ko
  INSTALL drivers/net/wireless/realtek/rtlwifi/rtl8192cu/rtl8192cu.ko
  INSTALL drivers/net/wireless/realtek/rtlwifi/rtl8192de/rtl8192de.ko
  INSTALL drivers/net/wireless/realtek/rtlwifi/rtl8192se/rtl8192se.ko
  INSTALL drivers/net/wireless/realtek/rtlwifi/rtl8723ae/rtl8723ae.ko
  INSTALL drivers/net/wireless/realtek/rtlwifi/rtl8723be/rtl8723be.ko
  INSTALL drivers/net/wireless/realtek/rtlwifi/rtl8723com/rtl8723-common.ko
  INSTALL drivers/net/wireless/realtek/rtlwifi/rtl_pci.ko
  INSTALL drivers/net/wireless/realtek/rtlwifi/rtl_usb.ko
  INSTALL drivers/net/wireless/realtek/rtlwifi/rtlwifi.ko
  INSTALL drivers/net/wireless/rndis_wlan.ko
  INSTALL drivers/net/wireless/rsi/rsi_91x.ko
  INSTALL drivers/net/wireless/rsi/rsi_sdio.ko
  INSTALL drivers/net/wireless/rsi/rsi_usb.ko
  INSTALL drivers/net/wireless/st/cw1200/cw1200_core.ko
  INSTALL drivers/net/wireless/st/cw1200/cw1200_wlan_sdio.ko
  INSTALL drivers/net/wireless/st/cw1200/cw1200_wlan_spi.ko
  INSTALL drivers/net/wireless/ti/wl1251/wl1251.ko
  INSTALL drivers/net/wireless/ti/wl1251/wl1251_sdio.ko
  INSTALL drivers/net/wireless/ti/wl1251/wl1251_spi.ko
  INSTALL drivers/net/wireless/ti/wl12xx/wl12xx.ko
  INSTALL drivers/net/wireless/ti/wl18xx/wl18xx.ko
```

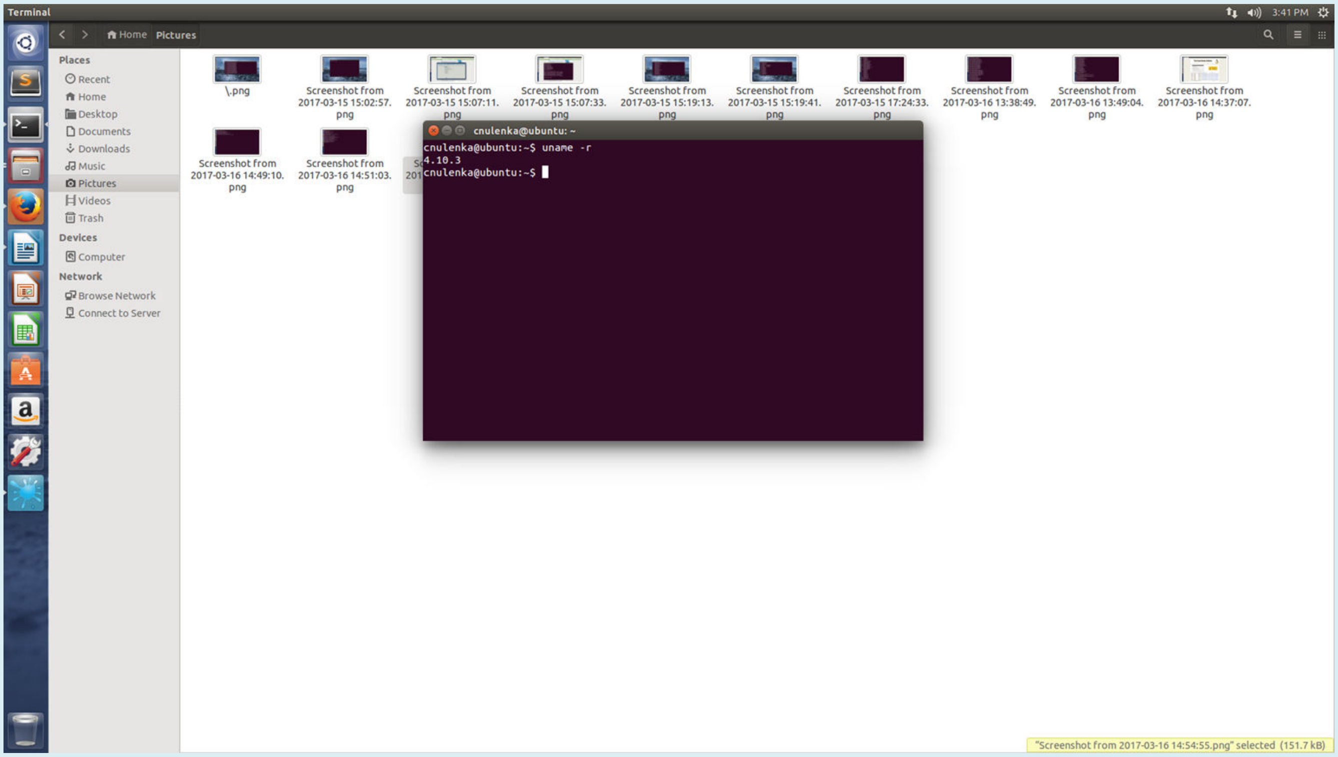
After 150 to 170 minutes, process comes to an end and the Linux Kernel gets installed.



```
  INSTALL /lib/firmware/ess/maestro3_assp_minisrc.fw
  INSTALL /lib/firmware/yamaha/ds1_ctrl.fw
  INSTALL /lib/firmware/yamaha/ds1_dsp.fw
  INSTALL /lib/firmware/yamaha/ds1e_ctrl.fw
  INSTALL /lib/firmware/yamaha/yss225_registers.bin
  INSTALL /lib/firmware/tehuti/bdx.bin
  INSTALL /lib/firmware/tigon/tg3.bin
  INSTALL /lib/firmware/tigon/tg3_tso.bin
  INSTALL /lib/firmware/tigon/tg3_tso5.bin
  INSTALL /lib/firmware/3com/typhoon.bin
  INSTALL /lib/firmware/emi26/loader.fw
  INSTALL /lib/firmware/emi26/firmware.fw
  INSTALL /lib/firmware/emi26/bitstream.fw
  INSTALL /lib/firmware/emi62/loader.fw
  INSTALL /lib/firmware/emi62/bitstream.fw
  INSTALL /lib/firmware/emi62/spdif.fw
  INSTALL /lib/firmware/emi62/midi.fw
  INSTALL /lib/firmware/kaweth/new_code.bin
  INSTALL /lib/firmware/kaweth/trigger_code.bin
  INSTALL /lib/firmware/kaweth/new_code_fix.bin
  INSTALL /lib/firmware/kaweth/trigger_code_fix.bin
  INSTALL /lib/firmware/ti_3410.fw
  INSTALL /lib/firmware/ti_5052.fw
  INSTALL /lib/firmware/mts_cdma.fw
  INSTALL /lib/firmware/mts_gsm.fw
  INSTALL /lib/firmware/mts_edge.fw
  INSTALL /lib/firmware/edgeport/boot.fw
  INSTALL /lib/firmware/edgeport/boot2.fw
  INSTALL /lib/firmware/edgeport/down.fw
  INSTALL /lib/firmware/edgeport/down2.fw
  INSTALL /lib/firmware/edgeport/down3.bin
  INSTALL /lib/firmware/whiteheat_loader.fw
  INSTALL /lib/firmware/whiteheat.fw
  INSTALL /lib/firmware/keyspan_pda/keyspan_pda.fw
  INSTALL /lib/firmware/keyspan_pda/xircom_pgs.fw
  INSTALL /lib/firmware/cpia2/stv0672_vp4.bin
  INSTALL /lib/firmware/yam/1200.bin
  INSTALL /lib/firmware/yam/9600.bin
  DEPMOD  4.10.3
sh ./arch/x86/boot/install.sh 4.10.3 arch/x86/boot/bzImage \
                System.map "/boot"
run-parts: executing /etc/kernel/postinst.d/apt-auto-removal 4.10.3 /boot/vmlinuz-4.10.3
run-parts: executing /etc/kernel/postinst.d/initramfs-tools 4.10.3 /boot/vmlinuz-4.10.3
update-initramfs: Generating /boot/initrd.img-4.10.3
run-parts: executing /etc/kernel/postinst.d/pm-utils 4.10.3 /boot/vmlinuz-4.10.3
run-parts: executing /etc/kernel/postinst.d/update-notifier 4.10.3 /boot/vmlinuz-4.10.3
run-parts: executing /etc/kernel/postinst.d/zz-update-grub 4.10.3 /boot/vmlinuz-4.10.3
Generating grub configuration file ...
Found linux image: /boot/vmlinuz-4.10.3
Found initrd image: /boot/initrd.img-4.10.3
Found linux image: /boot/vmlinuz-3.16.0-77-generic
Found initrd image: /boot/initrd.img-3.16.0-77-generic
Found linux image: /boot/vmlinuz-3.16.0-30-generic
Found initrd image: /boot/initrd.img-3.16.0-30-generic
Found memtest86+ image: /boot/memtest86+.elf
Found memtest86+ image: /boot/memtest86+.bin
done
cnulenka@ubuntu:~/linux/linux-4.10.3$
```

Step 9:

1. Reboot the system and choose the appropriate kernel (newly installed) from the Grub Boot Loader's Menu and its done.
2. We have now logged in to the newly installed custom configured kernel.
3. This can be verified by the following command - *uname -r*



Terminal
3:41 PM
Home
Pictures
Places
Recent
Home
Desktop
Documents
Downloads
Music
Pictures
Videos
Trash
Devices
Computer
Network
Browse Network
Connect to Server
\.png
Screenshot from 2017-03-15 15:02:57.png
Screenshot from 2017-03-15 15:07:11.png
Screenshot from 2017-03-15 15:07:33.png
Screenshot from 2017-03-15 15:19:13.png
Screenshot from 2017-03-15 15:19:41.png
Screenshot from 2017-03-15 17:24:33.png
Screenshot from 2017-03-16 13:38:49.png
Screenshot from 2017-03-16 13:49:04.png
Screenshot from 2017-03-16 14:37:07.png
Screenshot from 2017-03-16 14:49:10.png
Screenshot from 2017-03-16 14:51:03.png
"Screenshot from 2017-03-16 14:54:55.png" selected (151.7 kB)
cnulenka@ubuntu: ~

```
cnulenka@ubuntu:~$ uname -r
4.10.3
cnulenka@ubuntu:~$
```